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JOHN HENRY COMSTOCK, 1849-1931.
Portrait of 1884.

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PROFESSOR DON JOSÉ FIDEL TRISTÁN

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Professor J. Fidel Tristán.

(Portrait, Plate VIII.)

Professor don José Fidel Tristán, Director of the National Museum at San José, Costa Rica, died in that city on Saturday, January 23, 1932. He was the son of Fidel Tristán Céspedes and Praxedis Fernandez Acuña. His father was one of the first who established at his plantation of Cinco Esquinas (Five Corners) the preparation of coffee by machinery imported from Europe and he was a large exporter of this "golden grain" to European and South American markets. Having undertaken the construction of a cartroad over the central Cordillera to Carrillo, the original terminus of the Costa Rican railway, he lost heavily in the venture, so that his family had to contend with adversity.

José Fidel, born September 6, 1874, was the second child of eleven who survived to reach majority. In his early years he built water and wind mills, collected stones, stamps, insects and plants. In 1886 he entered the Normal and Model School of San José where he came under the instruction of Paul Biolley. Biolley was one of a group of young Swiss, which included Henry Pittier, Gustave Michaud and Jean Rudin, who had been invited by the Government of Costa Rica to assist in the educational development of the country. Biolley became well known in Europe and America for his natural history collections. He died in 1908 and a brief sketch of his life appeared in the NEWS for October, 1908, page 394-395. Tristán's father had sought to launch his son in a commercial career, but the natural disposition of the boy was toward scientific studies which led to his graduation as one of the first bachelors of the Liceo of Costa Rica in 1894. He learned the rudiments of meteorology from Pedro Reitz in the Instituto Fisico-Geografico, founded April 7, 1888, under the direction of Prof. Pittier, and he served as entomologist at the Museo Nacional.

The government of Chile having offered that of Costa Rica the opportunity for a group of young men to study in the Pedagogical Institute of Santiago, Tristán made application for an assignment in the fields of physics and chemistry. He received an appointment and with four other young compatriots spent nearly three years (March 1897-January 1900) in study in the southern republic, where he became acquainted with Dr. R. A. Phillippi, Director of the Museum at Santiago, Federico Phillippi, subsequently Director, and the entomologist Filiberto Germain.

In May, 1900, he became professor of physics and chemistry in the Liceo at San José, where he introduced German equipment into the laboratories, and, later in the same year, was named professor of zoology and mineralogy in the School of Pharmacy. In 1903 he was made Professor of Physics and Chemistry in the Superior College for Young Women, and in 1904 the duties of Subdirector of the same institution were added. In 1908, on the retirement of Miss Marian LeCappellain from the directorship, Tristán succeeded to this position, which he held until 1922. In 1912 he added his old professorship of physics and chemistry at the Liceo to his tasks and became Director of the Liceo when he left the Superior College. Finally, having resigned from the Liceo, he became Director of the National Museum, March 8, 1930.

On January 15, 1911, Tristán married Ester Castro Meléndez, who with three sons, Luis, Oscar and Marco Fidel, survive him.

The preceding sketch is greatly abbreviated from a two page article "Homenaje en memoria del Profesor Tristán" which appeared in *La Prensa Libre* of San José for February 2, 1932.

The writer made the personal acquaintance of Prof. Tristán on May 5, 1909, at the Young Women's College at San José, and on May 16th we took our first entomological trip together —from San José to the Rio Tiribi and the farm house of La Verbena. It was followed by others—to the Laguna de Ochomogo, Turrialba, Turrúcares, Surubres and, greatest of all, to the province of Guanacaste for thirty days. He spoke and wrote English fluently, a great boon to one whose Spanish was, as he truly said, "muy poquito". He was extremely kind

and helpful in every way, an entertaining talker, and to him, as stated in a volume which records our joint experiences in Costa Rica, "more than to any other one person do we owe much of our success".* When the great earthquake of May 4, 1910, demolished Cartago, our Costa Rican headquarters, he sought us on the following day among the ruins of the city.

We maintained a correspondence for more than twenty years after that catastrophe and his letters mention the excursions which he made to various parts of Costa Rica to collect material illustrating the natural history of his native land—to Oricuajo and El Roble, not far from Puntarenas, in July, 1911, and December, 1913, respectively, to the peninsula of Nicoya in January, 1912, to Santo Domingo in the Peninsula of Osa in May, 1913, and the volcano Rincón de la Vieja in April, and again in June, 1922. Still earlier, in 1908, he visited Santa Maria Dota. Frequent trips were made to various places in and near Irazú, to obtain material and observations for a monograph on that volcano to which he devoted much labor for many years but which, we believe, has never been published. It is to be hoped that its publication will not be indefinitely postponed.

In 1923 and 1927 on entomological trips to Costa Rica, our colleague Mr. Rehn had the pleasure and profit of accompanying Tristán on two trips to the cloud forest of La Palma, in the saddle of the Central Cordillera between Irazú and Barba (August 31 to September 2, 1923, and July 28 to 31, 1927), to Oricuajo, on the Pacific side (August 31 to September 3, 1927), as well on a number of short excursions in the vicinity of San José.

From these various expeditions he sent entomological material to Doctors Borelli, Silvestri, Grandi and Bezzi in Italy, Orthoptera to Mr. Rehn, Odonata to the writer, and, doubtless, other insects to various specialists. He stimulated his own students in San José to entomological interests. He wrote (February 26, 1911): "Mr. Clodomiro Picado, a young man who was studying natural history in Paris, is now here preparing his theme to get the D.Sc. I suggested to him the study of the Fauna of the Bromelia", which eventuated in the extensive memoir: *Les Broméliacées Epiphytes considerées comme milieu biologique*.†

Tristán had many plans for work not a few of which were frustrated by his teaching and administrative duties. A pas-

* *A Year of Costa Rican Natural History*, page 29.

† Bull. Sci. France et Belg. (7) xlvii: 215-360, 19 pls., 54 text figs. Paris, 1913. See the NEWS for Feb. 1914, pp. 87-88.

sage in his letter just quoted: "Every day I lament not to have time to devote to natural history studies", has a familiar ring. His earliest paper in entomology appears to be his report on the work done in this department of the Museo Nacional in 1895-96, published as an *Informe* of the Museum in 1896. It gives lists of Coleoptera, Hemiptera, Orthoptera, Hymenoptera, Neuroptera and Lepidoptera. Similar is his *Insectos de Costa Rica pequeña coleccion arreglada*, issued by the Museum in 1897. In 1901 he had an article on a case of Entomophily—pollination of *Asclepias curassavica* by the butterfly *Anartia fatima*, in the *Boletin* of the *Instituto Fisico Geografico*, volume I, pp. 318-322, with one plate. In collaboration with Prof. Gustave Michaud he published a paper *Probable Perception of Invisible Light by Some Animal Species* in the *Scientific American* for January 15, 1916 (page 81 etc.), illustrated by photographs of butterflies under a weak yellow screen, in ultra-violet and in infra-red light. They suggested that the visual apparatus of these insects is perhaps sensitive to the ultra-violet reflected by flowers allowing them to "select, among flowers, those best adapted to their digestive organs", as well as "to favor the union of sexes or to protect those butterflies which feed on ultra-violet flowers". The NEWS for October 1929 (page 273) contains a brief note by him on *A Swarm of Dragonflies in Costa Rica*.

Tristán published more on volcanos and earthquakes than on insects and his studies of Irazú, Poás and Rincón de la Vieja are among the most recent which we possess on these mountains. A fine series of photographs taken by him accompanies an interesting and popular article *Costa Rica—Vulcan's Smithy* by H. Pittier in the National Geographic Magazine for June, 1910, and he had a part in the preparation of ex-President Don Cleto Gonzalez Viquez's *Temblores, Terremotos, Inundaciones y Erupciones Volcánicas en Costa Rica, 1608-1910* (1910).

His long-time interest in physics doubtless led him into studies on ultra-violet light, in cooperation with Prof. Gustave Michaud, some of which were published in the *Scientific American* and in the *Archives des Sciences physiques et naturelles* of Geneva, 1913-1915.

His influence on the development of science in Costa Rica was undoubtedly great and it is saddening to realize that his departure, at the early age of fifty-eight, has brought his personal contact to an end. But the impulses which he started and furthered will surely continue to animate those who knew and loved him.

P. P. CALVERT.

On Apterism and Subapterism in the Blattinae (Orthoptera : Blattidae).

By James A. G. Rehn, Academy of Natural Sciences of Philadelphia.

The cockroaches of the subfamily Blattinae comprise an extensive representation of species distributed over the tropical and subtropical parts of the world, with certain of them, which are domiciliary or household pests, liable to occur almost anywhere except in the arctic and antarctic regions. The opening up of remote parts of the world is soon followed by the penetration of these latter unwanted and unloved travellers, of which the native homes are still in doubt. Within this subfamily, which contains nearly two score of genera, we find all degrees of size development in the organs of flight, ranging from fully developed in both sexes to completely absent in the same. The intermediate conditions are similarly well represented in both sexes, or flight organs are reduced in the female alone.

The extent and degree of differentiation in alar development in the Blattinae influenced the well-known French orthopterist, Dr. Lucien Chopard, some years ago, to tabulate the genera of the subfamily under divisions expressive of the degree of development and sexual association of the organs of flight, and from these tabulations to conclude that the three categories employed exhibited certain geographic correlations. This work was published under the title: "La distribution geographique des 'Blattinae' apteres ou subapteres."[1]

Having had some experience with the subfamily in question, several years ago I read Dr. Chopard's paper with much interest, and at that time jotted down certain points which seemed at variance with the impression left by the tabulations. Recently having reread the paper and rechecked my hasty notes, it seemed desirable, in view of the possibility that Dr. Chopard's summary might be accepted as unquestioned, to amplify and publish my impressions on the subject.

[1] Compt. Rend. Assoc. Franç. Adv. Sci., 1924 (Liége), pp. 975-977, (1925).

On the basis of alar development Chopard divided the genera comprising the subfamily into three categories, as follows:

1. Genera with tegmina and wings well developed in the two sexes.

2. Genera with tegmina and wings very short or absent in the female alone.

3. Genera with tegmina and wings very short or absent in the two sexes.

Following this classification the genera then considered were arranged under the respective sections, nine in the first, seven in the second and thirteen in the third.

All of the genera in the first section, Chopard states, are African or Indo-Australian, except the Neotropical *Pelmatosilpha*. Of those in the second section the majority are African, several Indo-Malayan and Australian and one (*Blatta*) cosmopolitan, but probably of African or Indo-Malayan origin. The third section is dominated by Australian genera, over eighty per cent. of the total in the section being from the Antipodes, another, *Stylopyga* (as there used equalling *Neostylopyga* of Shelford and present workers), is circumtropically established,[2] while the single genus *Eurycotis* Stål is given as American.

Unfortunately Chopard did not consider the genus *Lamproblatta* Hebard, described some few years prior to the date of his writing,[3] for placed in the tabulation it would have been the first completely apterous Neotropical genus. The relative position of *Lamproblatta* in such a tabulation, and the degree to which the genera *Pelmatosilpha* and *Eurycotis* form with it a cohesive American complex, vitiating to a considerable degree the soundness of Dr. Chopard's classification, are responsible for the present remarks.

The genus *Pelmatosilpha* Dohrn, placed in category one by Chopard, is entirely Neotropical in distribution, and comprises a series of closely related species possessing tegmina and wings

[2] In the American tropics the genotypic species (*N. rhombifolia*) is known from but a few areas; in Africa it is more generally present on the coast, while in the Malayan region it is widely distributed, and probably the genus originated there.

[3] Trans. Amer. Ent. Soc., XLV, p. 108, (1919).

in both sexes, ranging in the various entities from fully developed to reduced quadrate tegmina and vestigial, non-functional wings. The same genus passes without marked distinction into *Eurycotis* Stål,[4] which was placed by Chopard in his category three. In the last-mentioned genus we have a considerable series of species—seventeen in the West Indies[5] and southeastern United States alone—in which the tegmina range from reduced and transversely subquadrate, attingent mesad, to lateral, slip-like structures, with the wings vestigial in the former and absent in the latter. The genus *Eurycotis* is distributed from the southern United States, Mexico and the West Indies south to at least Ecuador and eastern Brazil. Carrying alar reduction to its logical conclusion in the same complex of the subfamily is the genus *Lamproblatta* Hebard, representing an opposite extreme from *Pelmatosilpha,* and in which tegmina and wings are completely absent in the adult condition of both sexes. This similarly Neotropical genus ranges from the Canal Zone, Panama, to central Matto Grosso, Brazil, east to Trinidad.

The genera *Pelmatosilpha, Eurycotis* and *Lamproblatta* represent sections of a complex embracing not less than forty-one described and valid species, and in which combined assemblage we find, uniformly in both sexes, every shade of alar development from appendages fully formed and reaching to the apex of the abdomen (certain *Pelmatosilpha*), to the complete absence of all organs of flight (all seven species of *Lamproblatta*[6]). In Cuba alone we find twelve species of the genus *Eurycotis,* including forms with short, transversely truncate tegmina with attingent sutural margins, as well as others with these organs lateral and slip-like. The wings correspondingly are vestigial to absent.

From the above it is evident that the influences which operate for tegminal and alar reduction, at least in this complex of the subfamily, are not regional, and also, broadly speaking, that

[4] For discussion of the relationship of these genera see Rehn and Hebard, Bull. Amer. Mus. Nat. Hist., LIV, p. 147, (1927).

[5] For a study of the majority of the West Indian species see Rehn and Hebard, Idem., pp. 154-187.

[6] See Rehn, Trans. Amer. Ent. Soc., LVI, pp. 27-38, (1930).

no geographic correlation of alar development exists in this particular assemblage. While our distributional information for these genera is still "spotty," it is sufficient to show conclusively the degree of variability in alar development in the Cuban species of *Eurycotis,* the presence of all three genera in or in the immediate vicinity of the Canal Zone, Panama, and also in eastern Ecuador, as well as at least two of the genera in Trinidad, Costa Rica and upper Amazonia. When our knowledge of the Blattidae of these latter areas is relatively as full as that of the Canal Zone species, we probably shall find all three genera present. Apparently the factors which operate to produce the respective conditions must be looked for in directions other than geographic. I have personally collected all three genera and, speaking broadly, their habits are similar—secretive and in daylight negatively phototropic, utilizing many types of chinks and crannies for hiding, such as under bark, palm frond bases, the dead adherent stubs of the same, in hanging dead leaves, under rotting vegetable matter, beneath stones and fallen logs. It is not known whether the fully alate *Pelmatosilphas* use their wings to escape, nor have I any knowledge of their being attracted to light at night.

Apropos of the Old World genera of the subfamily listed by Chopard, there can be little question as to the really close relationship of *Periplaneta* Burmeister and the African genus *Pseudoderopeltis* Krauss, even though the latter shows pronounced sexual dimorphism in other features as well as the degree of development of the alar appendages. The common origin of these two genera can hardly be questioned, even though they would fall into separate categories of Chopard's tabulation (i.e. *Periplaneta* in number one, *Pseudoderopeltis* in number three). Again the recently erected genus *Blattina* Hebard [7] is very close to *Blatta,* in which its genotype had been placed, yet the former possesses an equal degree of alar development in the two sexes, while the latter exhibits a marked sexual difference in tegminal structure and wing presence. On the other hand *Neostylopyga* Shelford (= *Stylopyga* as used

[7] Proc. Acad. Nat. Sci., Phila., LXXXI, p. 84, (1929).

by Chopard) is an exceedingly close relative of *Blatta,* but has the tegmina in both sexes reduced to lateral slips while the wings are absent.

The East African genus *Cartoblatta* Shelford was placed by Chopard in the category (one) having the tegmina and wings well developed in the two sexes. The male possesses fully developed tegmina and wings, but the female has the tegmina reduced and quadrate and the wings vestigial—in fact both no more developed than in a number of species of *Eurycotis,* which was placed in category three.

To summarize, the factors producing brachypterism or subapterism in the Blattinae, as in the subfamilies Pseudomopinae, Ectobiinae and Epilamprinae of the Blattidae, cannot be considered geographic per se, although environmental and other influences, such as altitude and possibly humidity or aridity under special conditions, appear to be or have been motivating causes. Elsewhere I have recently demonstrated [8] the correlation of altitude with relative brachypterism in the normally fully alate African *Ectobius africanus,* and it is strongly suggested in a number of cases which have yet to be given critical study. Chopard has called attention to the high percentage of apterous or subapterous genera of Blattinae in Australia, and suggests this degree of specialization as a response to desert conditions. Brachypterism or even complete apterism in the female sex is marked in desert cockroaches, generally correlated with fully alate males, often of nocturnal habits. This tendency is probably as marked in the Old World as it is in the Sonoran deserts of the southwestern United States and adjacent Mexico. However, the percentage of brachypterism and subapterism to be found among the Blattidae of the humid rain-forest areas of tropical America refutes any attempt to make a purely geographic or zonal correlation of apterism or brachypterism. The Blattidae of tropical regions are no different from other groups of animal life in that the large, striking and obvious are first made known, while the subapterous and brachypterous, usually secretive species generally require for their discovery the more detailed explorations of trained field workers. Tropical regions

[8] Proc. Acad. Nat. Sci., Phila., LXXXIII, pp. 346-353, (1931).

which are now fairly well known orthopterologically, such as the West Indies and parts of Central America, show a far larger percentage of subapterous and brachypterous blattids than is known from countries less carefully studied.

Macropterism is clearly the primitive condition in the Blattidae, as affirmed by paleontological and an increasing amount of phylogenetic data. Chopard has left no doubt regarding his support of this very evident conclusion. Brachypterism and apterism in the cockroaches are evidently responses to influences which under given conditions, environmental or what-not, inhibit or at least limit the success of fully alate types. These conditions are much less fundamental than was believed to be true by the past generation of workers. So far we have made but a beginning in solving the involved phylogenetic history of existing Blattidae, but this general conclusion gains added support with each definite addition to our knowledge of these animals.

Bookseller's Separates.

In a statement (ENT. NEWS 43: 258) made to call attention to the difference between "author's separates and bookseller's separates", it is said that cut-out articles are *not* genuine separates.

The cut-out articles are the more reliable separates. The Canadian Entomologist has sent out pages of the journal as separates. Separates of my paper "Localities of insects collected by Robertson", Psyche 35: 61, contain the errors, *"wellesleyanaa* and *novae, angliae"* instead of "wellesleyana and novae-angliae", as in the original. The separate is an erroneous copy of the published article.—CHARLES ROBERTSON, Carlinville, Illinois.

Insect Racketeers.

Our attention having been called to advertisements holding out great hopes of making large sums of money by collecting and selling insects, particularly butterflies, it seems almost obligatory to warn persons attracted by such advertisements that very few realize such hopes. No one should enter into any engagement to supply insects to parties about whom they know nothing without first learning from reliable sources something of their honesty and business standing.—EDITOR.

On the Activity of Butterflies at Night (Lepid.: Rhopalocera).

By HAROLD O'BYRNE, Webster Groves, Missouri.

That butterflies are lovers of the sunshine and are inactive at night is an accepted fact; most students agree that they spend the night in a state physiologically similar to the sleep of vertebrates. It is to be expected, therefore, that efforts to arouse butterflies to activity at night, even in brightly lighted places, are foredoomed to failure. Comparatively few attempts to determine this have been made. The purpose of the observations described below was to test this expectation; the results obtained confirm my belief that sleeping butterflies would be hard to awaken, and also show that after being disturbed, they seek the darkest spots available, where they resume their interrupted rest.

The observations were made during the summer of 1931, in a brightly-lighted electric power station in St. Louis, Missouri. The butterflies observed (other than two exceptional individuals later noted) entered the building in the daytime, were trapped, and finally came to rest near closed windows through which they had vainly tried to escape. The nights when observations were made were all clear, and followed warm, sunny days when butterflies were generally active. Temperature indoors, due to machinery in operation, was in the neighborhood of 95 degrees, Fahrenheit; and was somewhat higher than temperature on the outside. The time used is Central Standard in all cases.

PHYCIODES THAROS Dru. One was found on a window sill at 11 P. M. A gentle push caused it to flap its wings a few times. Later, while being carried by the wings to another place, it began to kick its legs; when released, it fluttered a little and then became motionless. Pushing it repeatedly caused a short flight each time. The second individual, found on the floor at 11 P. M., was picked up by the wings and thrown into the air. It flew rapidly upward and disappeared in the shadows that hid the ceiling. A few seconds later it descended to the floor, remaining motionless for at least half an hour. The third speci-

men, observed at 8 P. M., was disturbed twice by pushing; a short flight resulted each time.

POLYGONIA INTERROGATIONIS UMBROSA *Lint.* A female found resting on a window frame at 1 A. M. was not disturbed by the heavy jar of a ladder placed against the window. After being picked up by the wings, nearly a minute elapsed before it began to move its legs. It was released on my open hand, where it did not move, except to take hold with its feet. When prodded, it opened and closed its wings several times and then flew about ten feet. Its wings opened and closed slowly for several minutes; then it flew again and hid in the shadows some fifty feet overhead.

VANESSA ATLANTA Linn. A female was resting on a window frame at 11 P. M. The jar of a heavy ladder allowed to fall against the frame failed to arouse the butterfly. Another female, first seen at 1 A. M., was resting on the outside of a window. It, too, was difficult to arouse; closing the window failed to disturb it. When picked up and then released in the air inside of the building, it flew to the floor and walked slowly into a nearby shadow, where it remained motionless until pushed. This time, it flew up to a girder about forty feet above, and came to rest in the glare of a bright light. In this individual we have an attraction to the light that was not observed in the others. Furthermore, it must have been attracted to the light originally, for it was found on the outside of the lighted window.

PIERIS RAPAE Linn. A male and a female were found resting on window frames at 7:30 P. M. Three attempts to arouse the male by pushing resulted in as many flights of a few feet each. When thrown out through an open window, it flew to the ground and stayed in the spot where it alighted. The female was not disturbed until about 10 P. M. After being pushed, it flew to a height of about 20 feet, circled about, and alighted on the floor. A second push caused it to fly about eight feet, coming to rest in the darkness of a shadow. Disturbed a third time, it flew high and disappeared in the ceiling shadows, where it stayed.

EUREMA LISA Bdv. & Lec. A female was found on the wall

at about 1 A. M. Repeated efforts to arouse it were futile; only short flights resulted.

PAPILIO CRESPHONTES Cram. A male was seen resting on the outside of a window at 11 P. M. When dislodged with an insect net, immediate activity began; it struggled violently in the net, in great contrast to the behavior of all the butterflies mentioned before. Like the second *V. atalanta* observed, it must have come to the window after dark, in response to the lights within.

The important fact gleaned from these observations is the difficulty of arousing butterflies from their nocturnal stupor; my efforts to provoke them to sustained flight were generally unsuccessful, a result that I had anticipated. This confirms the observations of Rau and Rau, '16, who also found butterflies hard to arouse from sleep. The high temperature in the building shows that the sluggishness displayed by the butterflies was not an effect of cool night air, such as would have complicated the observations had they been made out-of-doors. On the contrary, any effect that temperature could have had upon their behavior would have urged them to become active. Hayward, '30, has suggested that observed instances of butterflies flying at night are probably due to their having been disturbed from their rest by passing animals. Some such instances can be so explained, but the foregoing observations show that such behavior is unusual. The facts clearly indicate that the periods of activity and of rest in butterflies are so strongly fixed, psychologically and physiologically, that the simulating of day conditions by artificial light does not influence them to day activity. However, the data show that for at least two individuals there was a reversal of this behavior, where response was to artificial light. It would be interesting to find what conditions influence such exceptional behavior.

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The Rhopalocerous Lepidoptera of Scott County, Kansas.

By VIRGIL F. CALKINS, Scott City, Kans.

INTRODUCTION.

The main reason for preparing this list of the butterflies of Scott County, Kansas, is because of the interest expressed in the species local to this region by various entomologists with whom I have been in correspondence.

So far as I know, I believe not very much has ever been written about the butterflies of the State of Kansas—certainly not the western part of the State. Hence, a description of the region about which this list is written will be of interest.

Scott County is situated in the center of the extreme western part of the state, about sixty miles from the Colorado line. It is about twenty-four miles wide by thirty miles in length, and has an area of 720 square miles. The elevation of Scott City is 2,970 feet above sea level. The whole state lies within what is termed the Great Plains Region, the western half consisting of broad, level prairie, being devoid of trees in general, except along the shallow prairie streams.

In the northern part of Scott County, in the vicinity of Beaver Creek—a small tributary of the Smoky Hill River, one encounters the hilly district—otherwise known as the "bad lands" of western Kansas. It consists of cuts, ravines and canyons of shale, sand and limestone, the formations being rugged and fantastic in form, some with flat-topped mounds and long rocky ridges many of which are of a shelving and rounded contour. Beginning at the summits of these hilly districts, which are numerous, and continuous in various parts of the west, and north-western, parts of the state, is the level prairie. In the northern part of Scott County, a portion of this type of country has been set aside by the state as the Scott County State Park, which is one of the favored collecting places. Various species of cacti and yuccae flourish here, the general appearance suggesting that of semi-arid desert country.

Inasmuch as the whole of the western part of the state is level prairie, a list of the butterflies of Scott County would necessarily be representative of this part of the state.

As far as my knowledge goes, there are no other collectors

of lepidoptera in the entire western part of the state of Kansas.

I trust that this list will therefore have value for the entomologist who has an interest in the lepidoptera of this region.

Family PAPILIONIDAE.

PAPILIO POLYXENES Fabr. The Eastern Swallowtail. The common black Swallowtail which ranges over practically all of the eastern half of the United States. Abundant, and very easily reared.

P. BAIRDI BRUCEI Edw. Bruce's Butterfly. A decidedly rare insect this far east; two specimens have been taken only, in the month of June. One example had one of the tails missing but both specimens were in very fresh condition.

P. CRESPHONTES Cram. The Giant Swallowtail. This, also, is an uncommon insect to be taken locally. All specimens that have been taken were badly worn and torn, indicating that they had come from a distance. Some half dozen specimens have been captured only one of which was respectable enough for collection purposes.

P. GLAUCUS L. The Tiger Swallowtail. This beautiful Papilio, according to its distribution records, should be fairly plentiful in this region. On the contrary it is somewhat scarce. The male sex is usually most prevalent and the species appears to be most common, whenever found, just as the cherry and apple trees burst into bloom. Yellow females are not common, and when taken, represent the first brood of the year.

P. DAUNUS Bdv. Two-tailed Swallowtail. The two-tailed Swallowtail is a very interesting capture indeed, for this locality. While far from being common, the writer usually takes a few each year. This species is, as a rule, peculiar to the Rocky Mountain region, or at most, the valleys and foot hills of mountainous ranges. Hence, its appearance this far east on the prairie regions of Kansas is very interesting. A fact concerning *Papilio daunus* not usually known is that it is double-brooded in this region. The imagoes emerging from over-wintering chrysalids are somewhat small and dwarfed, and the summer examples are giants, the females measuring four and one-half to five inches.

P. TROILUS L. Spice Bush Swallowtail. Extremely rare. But two specimens have ever been taken.

Family PIERIDAE.

PIERIS OCCIDENTALIS Reak. The Western White. While *occidentalis* is a common insect of the more western states, it is highly doubtful if, as a species, it is generally taken in Kansas. Two examples, a male and a female, have been taken by the writer, and were identified as *occidentalis* by Dr. Dyar.

P. PROTODICE Bdv. & Lec. The Common White, the Checkered White. This is a quite common butterfly some seasons and apparently scarce during others. The best way to obtain perfect specimens for collection is to rear them on mustards. The majority of them taken at large have wing punctures due to parasitization. It is triple-brooded in this region. It can usually be taken at any time during the collecting season, but most commonly during the early fall.

P. PROTODICE VERNALIS Edw. The Vernal White. The spring form of the above species is only found in numbers enough to assure the propagation of the species. Very many of the abundant larvae encountered in the fall are victims of parasites and are consequently destroyed, making the spring form *vernalis* less common.

P. RAPAE L. The Cabbage Butterfly. An extremely common butterfly. Plentiful at all times throughout the collecting season. Stray specimens that have emerged during the latter part of February and the first days of March have been observed. It appears commonly in April.

NATHALIS IOLE Bdv. Dwarf Yellow. A common little yellow butterfly. Stray specimens can be taken at various intervals during the spring. It begins to appear more commonly during the latter part of July, and by September, it is abundant where it frequents the ditches along the roadsides flying up and down in regular streams in twos and threes. The writer has reared specimens on Bush Marigold, Cosmos and other allied plants.

ZEGRIS OLYMPIA Edw. Olympian Marble-wing. A single male specimen of this very desirable species was taken on the outskirts of the city early in April, 1932, by Wilson Finkenbinder and kindly presented to me. Unknown in this locality except for this one specimen.

CATOPSILIA EUBULE L. Cloudless Sulphur. Not always common, but it can usually be taken in September. Very swift on

the wing, scarcely taking the time to stop on any sort of flowers for a sip of nectar unless they be of a deep-tubed variety. Nasturtiums and morning glories are to its liking. The females frequent legumes, especially bean patches, and occasionally deposit eggs.

C. EUBULE PALLIDA Ckll. The Pallid Sulphur. The white form of the female of *eubule* is more commonly taken than regular yellow forms. Even the narrow band of brown on the outer margins of the primaries is somewhat bleached and pale.

CATOPSILIA PHILEA L. Red-barred Sulphur. An excellent female specimen of this magnificent species was recorded in August of 1932.

C. AGARITHE Bdv. The Large Orange Sulphur. A few years ago a single male of this species was taken, and also one or two females, the latter being in very poor condition. A rare capture.

C. STATIRA Cram. Statira Sulphur. An interesting capture for this region. Thought to have been observed previously, no actual specimens were taken until 1931. Males are confused with *eubule* when on the wing, but females are recognizable by the narrow border of dark brown along the margins of the primaries which is broader and more regular than that of *eubule*. Very rare.

KRICOGONIA LYSIDE Godt. Godart's Sulphur. Until 1931, about a half dozen individual specimens were all that had ever been captured in this locality. These specimens were taken in the early spring fluttering around apple trees which were in full bloom. During the summer of 1931, the species was apparently common in some places and could usually be found about Alfalfa fields, although perfect examples were hard to obtain. Many forms, or varieties, were indicated by the captured specimens. Females were most common. Whether the insect will be taken in any numbers during 1932 remains to be seen. It would seem that a colony has got a footing in this locality.

ZERENE CAESONIA Stoll. Southern Dog's Head Butterfly. Not taken commonly, but observed every year, usually in August and September.

Z. CAESONIA ROSA McNeill. The Rosy Dog Head. Two specimens of this fall form of *caesonia* have been taken in late September.

EURYMUS EURYTHEME Bdv. Boisduval's Sulphur, Common Orange Sulphur. A very common butterfly, everywhere, on the plains of the west. Alfalfa fields are literally alive with the vivid yellow and orange of the teeming swarms of this beautiful butterfly.

E. EURYTHEME ALBA Stkr. Boisduval's White Sulphur Female. The white female, or albinic, form of the above species while not common like the regular form nevertheless is plentiful.

E. EURYTHEME AMPHIDUSA Bdv. The Flavid Sulphur. *Amphidusa,* the summer form, is abundant.

E. EURYTHEME AMPHIDUSA ALBA Stkr. This female form, considered by some, separate from typical albinic *eurytheme,* also is fairly plentiful.

E. EURYTHEME ERIPHYLE Edw. The Eriphyle Sulphur. A yellow summer form of *eurytheme* which is common.

E. PHILODICE Godt. The Eastern Sulphur, Puddle Butterfly. The "yeller" butterfly so frequently mentioned in poetry and literature is seldom taken this far west, and the few specimens that I believe to be true *philodice* have been taken in the early summer.

EUREMA MEXICANA Bdv. Mexican Yellow. The Mexican Yellow represents only an occasional visitor to this region. It was plentiful during one year, when over 100 specimens were collected. Since that time it has only been observed occasionally—usually in the fall. The species has a weak flight and is not all together easily captured, it becoming confused and disturbed, when it darts in a somewhat zig-zag fashion making it hard to place a net over it.

E. NICIPPE Cram. The Small Orange, Nicippe Yellow. Somewhat rare in this locality and hard to get in perfect condition. Most specimens have frayed wings or are otherwise imperfect.

E. EUTERPE Men. (Lisa Bdv. & Lec.) The Little Sulphur. Also an uncommon species and never taken in any numbers, in this locality.

Family DANAIDAE.

DANIAS PLEXIPPUS L. The Monarch. An abundant butterfly, especially in the fall. Tattered examples are seen passing north in April.

D. BERENICE STRIGOSA Bates. Striated Queen. Not very common. The author has taken a dozen or more specimens, from the month of July onward until September. Both sexes have been taken, the female having been observed to oviposit on a species of the Milkweed family called Whorled Milkweed, locally.

(To be continued)

Vespa crabro L. in Pennsylvania (Hymen.: Vespidae).

It may be of interest to readers of ENTOMOLOGICAL NEWS that *Vespa crabro*, the European hornet, this large and pretty, but otherwise not at all pleasant insect, has doubtless taken a foothold in northeastern Pennsylvania. In the fall of 1931, in September and October, I collected a number of specimens in our garden, located at the outskirt of the city of Scranton in Lackawanna County, where they were nibbling on the bark of a big and rather old lilac bush. I collected the specimens on several sunny days, mostly in the afternoon, but did not lose much time in watching them, otherwise I could have collected many more specimens. I suppose, that they must have had their nest somewhere in the woodland adjoining our property of 3 acres.

According to Frank E. Lutz (Field Book of Insects, 1930), Comstock (Introduction to Entomology, 1925), and Howard (Insect Book, 1902), the species was accidently introduced into this country a number of years ago and occurs only in the vicinity of New York City, Long Island, Connecticut and certain parts of New Jersey. The above mentioned catches show evidently that this insect is slowly spreading westward. I do not know, if it ever has been recorded from Pennsylvania before. MAX ROTHKE, Scranton, Pennsylvania.

The extension of *V. crabro* southward is shown by the following records. The collection of the Academy of Natural Sciences of Philadelphia contains two specimens from Philadelphia, one August, 1911, the other October 14, 1914, that of the University of Pennsylvania one from the campus May 31, 1932, and a male and female from Mapleshade, New Jersey, September 20, by Dr. R. G. Schmieder. Mr. E. T. Cresson, Jr., has seen a nest at Swarthmore, Pennsylvania, and knows of one at New Britain, Penna. Two specimens from Cheyney, Penna., are before me, October 10, 1929, by Mrs. A. S. Calvert, and September 5, 1931, by Mr. Joseph Derry. EDITOR.

Entomological Literature

COMPILED BY LAURA S. MACKEY UNDER THE SUPERVISION OF E. T. CRESSON, JR.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

The **figures within brackets** [ ] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of ENTOMOLOGICAL NEWS for 10c. The number of, or annual **volume**, and in some cases the part, heft, &c. the latter **within** ( ) follows; then the pagination follows the **colon** :

All continued papers, with few exceptions, are recorded only at their first installments.

*Papers containing new forms or names have an * preceding the author's name.

(S) Papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

☞*Note the change in the method of citing the bibliographical references, as* **explained above.**

Papers published in the Entomological News are not listed.

GENERAL.—Carpenter, F. M.—The lower permian insects of Kansas. Part 5. Psocoptera and additions to the Homoptera. [16] 24: 1-22, ill. **Felt, E. P.**—Shade trees threatened by insect pests. [76] 1932: 59-62. **Gunder, J. D.**—International nomenclature stew. [19] 27: 165-166, ill. **Imms, A. D.**—Origin of insects from Crustacea. [31] 130: 95. **Jacot, A. P.**—The status of the species and the genus. [90] 66: 346-364. **Janet, C.**—Obituary. By L. Berland. [24] 101: 157-164, ill. **Joy, N. H.**—What is the meaning of a pupa? [21] 44: 87-88. **Matthey, R.**—Les chromosomes et la systématique zoologique. [Rev. Suisse Zool.] 39: 229-237. **McClendon, J. F.**—Doodle-bugs and law-makers. [68] 76: 81-82. **Myers, J. G.**—The original habitat and hosts of three major sugar-cane pests of tropical America (Diatraea, Castnia and Tomaspis). [22] 23: 257-271, ill. **Peterson, A.**—Are economic entomologists becoming "Insecticide minded?" [6] 40: 159-165. **Smith, R. C.**—A summary of the population of injurious insects in Kansas for 1931. [103] 5: 65-92, ill. **Trouvelot, B.**—Recherches sur les parasites et predateurs attaquant le Doryphore en Amerique du nord et envoi en France des premières colonies des espèces les plus actives. [An. Epiphyties, Paris] 17: 408-445, ill. **Wasmann, P. E.**—In Memoriam. By H. Schmitz. [101] 75: 1-57, ill.

ANATOMY, PHYSIOLOGY, ETC.—Barnes & Kohn—The effect of temperature on the leg posture and speed of

creeping in the ant Lasius. [92] 62: 306-312, ill. **Brug, S. L.**—Chitinisation of parasites in mosquitoes. [22] 23: 229-231, ill. **Burgess, E. D.**—A comparison of the alimentary canals of the active and hibernating adults of the Mexican bean beetle Epilachna corrupta. [43] 32: 249-261, ill. **Cameron, A. E.**—The rearing of Haematopota pluvialis, (Cleg, Tabanidae) under controlled experimental conditions. [31] 130: 94-95. **Carpenter, G. D. H.**—Resemblance of moths to bird-droppings. [Pro. Ent. Soc. London] 7: 22-23. **Carter, W.**—Studies of populations of Pseudococcus brevipes occurring on pineapple plants. [84] 13: 296-304, ill. **Currie, G. A.**—Oviposition stimuli of the burr-seed fly, Euaresta aequalis (Trypetidae). [22] 23: 191-193, ill. **Davidson, J.**—Resistance of the eggs of Collembola to drought conditions. [31] 129: 867, ill. **Dixey, F. A.**—The plume-scales of the Pierinae. [36] 80: 57-75, ill. **Eastham, L.**—Currents produced by the gills of mayfly nymphs. [31] 130: 58, ill. **Eltringham, H.**—On an extrusible glandular structure in the abdomen of Mantispa styriaca. [36] 80: 103-105, ill. **Fischer, E.**—Artbastarde von schmetterlingen und ihre F2-und rückkreuzungsgenerationen. [Vierteljahrsschrift d. Naturf. Ges. Zürich] 76: 214-303, ill. **v. Frankenberg, G.**—Mehrfachbildungen und verschmelzungen an den fühlern von Melolontha. [34] 99: 87-98, ill. **Fuller, C.**—The thorax and abdomen of winged termites. [Union So. Africa Dept. Agric.] Ent. Mem. No. 2: 49-78, ill. **Harrison, J. W. H.**—The recent development of melanism in the larvae of certain species of Lepidoptera with an account of its inheritance in Selenia bilunaria. [Pro. R. Soc., London] (B), 3: 188-200, ill. **Haupt, H.**—Die mundteile der Dryinidae. [34] 99: 1-18, ill. **Henson, H.**—The development of the alimentary canal in Pieris brassicae and the endodermal origin of the malpighian tubules of insects. [53] 75: 283-305, ill. **Hingston, R. W. G.**—Changes in the method of insect protection at successive periods of growth. [Pro. Ent. Soc. London] 7: 12-14. **Holdaway, F. G.**—An experimental study of the growth of populations of the "Flour Beetle" Tribolium confusum, as affected by atmospheric moisture. [Ecol. Monographs] 2: 261-304, ill. **Jordon, K.**—Calliper-like appendages in some American moths. [Pro. Ent. Soc. London] 7: 16. **Kaufmann, O.**—Einige bemerkungen über den einfluss von temperaturschwankungen auf die entwicklungsdauer und streuung bei insekten und seine graphische darstellung durch kettenlinie und hyperbel. [46] 25: 353-361, ill. **Learned, E. T.**—An occurrence of spiral segmentation in

Apantesis nais (Arct.). [6] 40: 167-180, ill. **LeCharles, L.**—Anomalies chez des Lépidoptères. [25] 37: 151-152, ill. **Leeson, H. S.**—The effect of temperature and humidity upon the survival of certain unfed rat fleas. [Parasitology] 24: 196-209, ill. **Parat & Wou-Tseng-Cheng.**—Nature et origine des constituants cytoplasmiques de la cellule sexuelle male de Notonecte. [77] 110: 543-546, ill. —**Schulze, P.**—Ueber das zustandekommen des zeichnungsmusters und der schmelzfärbung in der zeckengattung Amblyomma nebst bemerkuhgen über die gliederung des ixodidenkörpers. [46] 25: 508-533. **Seifert, B.**—Anatomie und biologie des Diplopoden Strongylosoma pallipes. [46] 25: 362-507, ill. **Steopoe, J.**—Etude sur le plasmosome et les chromosomes sexuels dans la spermatogenèse de Nepa cinera et Naucoris cimicoides. [Arch. Zool. Exp. et Gén., Paris] 72: 577-592, ill. **Tokunaga, M.**—Morphological and biological studies on a new marine chironomid fly, Pontomyia pacifica, from Japan. [Mem. Coll. Agric. Kyoto Imperial Univ.] 1932: 56 pp., ill. **Uvarov, B. P.**—Bioclimatograph, an improved method for analyzing bioclimatic relations of insects. [84] 13: 309-311, ill. **Wigglesworth, V. B.**—The function of the so-called rectal glands of insects. [Pro. Ent. Soc. London] 7: 18. **Yeager & Tauber**—Determination of total blood volume in the cockroach, P. fuliginosa, with special reference to method. [7] 25: 315-327.

ARACHNIDA AND MYRIOPODA.—*Badcock, H. D.—Arachnida from the Paraguayan Chaco. [Jour. Linn. Soc., London] 38: 1-48, ill. **Ewing, H. E.**—Notes on the taxonomy of three economic species of mites, including the description of a new species. [95] 45: 99-101. ***Mooser, H.**—Ornithodorus nicollei spec. nov. [An. Inst. Biol., Mexico] 3: 127-131, ill. (S).

THE SMALLER ORDERS OF INSECTS.—Carpenter, F. M.—Additional notes on Nearctic Mecoptera. [19] 27: 149-151. **Killington, F. J.**—On the male genital structure of Psectra diptera, with some remarks on the wing venation. [8] 68: 153-156, ill. ***Kimmins, D. E.**—Two new Hemerobiidae. (S). [9] 65: 160-162, ill. **Putman, W. L.**—Chrysopids as a factor in the natural control of the oriental fruit moth. [4] 64: 121-126.

HEMIPTERA.—*Ancona, L.—Los jumiles de taxco Atizies taxcoensis spec. nov. [An. Inst. Biol., Mexico] 3: 149-162, ill. (S). ***Bruner, S. C.**—Another new Pamphantus from Cuba (Lygaeidae). [19] 27: 141-144, ill. **China,**

W. E.—Reduviid bugs (Apiomerinae) capturing their insect prey by means of adhesive resin-covered fore-legs. [Pro. Ent. Soc. London] 7: 12. ***Davis, W. T.**—Additional records of North American Cicadas with descriptions of new species. [6] 40: 241-264, ill. ***Dowell, A.**—A new Arytaina (Chermidae). [103] 5: 93-94, ill. ***Gillette & Palmer**—The Aphidae of Colorado. Part II. [7] 25: 369-496, ill. **Hoffman, C. H.**—The biology of three North American species of Mesovelia (Mesoveliidae). [4] 64: 126-134, ill. ***Lawson, P. B.**—The genus Tinobregmus (Cicadellidae). [7] 25: 359-365, ill.

LEPIDOPTERA.—Bates, M.—Notes on metamorphosis of the Brassolidae. [19] 27: 155-163, ill. ***Bell, E. L.**—Studies in the genus Phocides with descriptions of new species (Hesperiidae). [1] 58: 169-299, ill. ***Bell, E. L.**—Notes on some American Hesperidae and descriptions of new species [19] 27: 131-141, ill. ***Clark, A. H.**—The forms of the common Old World swallowtail butterfly (Papilio machaon) in North America, with descriptions of two new subspecies. [50] 81, Art. 11: 15 pp., ill. ***Clark, B. P.**—Descriptions of four new Sphingidae and notes concerning two others. (S). [N. Eng. Zool. Club] 13: 39-42. **Gabriel, A. G.**—Catalogue of the type specimens of Lepidoptera Rhopalocera in the Hill Museum. 1932: 40 pp. **Griffin, F. J.**—An attempt to determine the true dates of publication of Hewitson (W. C.). Illustr. New Spec. Exot. Butterflies, 5 Vols. [1852-] (1856-) 1876. [71] 37: 189-206. **Hoffmann, C. C.**—Roberto Mueller y su importancia en el conocimiento de los Lepidopteros de Mexico. [An. Inst. Biol., Mexico] 3: 133-148, ill. **Jordan, K.**—Resemblance between Arctiids and Syntomids. [Pro. Ent. Soc. London] 7: 16-18, ill. **Kaye, W. J.**—Some butterflies of the West Indies. [Pro. Ent. Soc. London] 7: 1. The occurrence of Dismorphia spio in Porto Rico. [Pro. Ent. Soc. London] 7: 2. **Macy, R. W.**—The occurrence of Atlides halesus (Lycaenidae) in northwestern Oregon. [4] 64: 144. ***Meyrick, E.**—Exotic Microlepidoptera. 4: 193-256. (S). **Petersen, W.**—Die arten der gattung Swammerdamia. [52] N.F. 1: 197-224, ill. ***Prout, L. B.**—New genera and species of Sterrhinae (Fam. Geometridae). [71] 37: 229-251. (S). **Simmons & Ellington.**—A biography of the Angoumois grain moth. [7] 25: 265-281. **Stanley, W. W.**—Observations on the flight of noctuid moths. [7] 25: 366-368. **Wyss, A. E.**—Guide to the butterflies of Cincinnati and vicinity. [Jr. Soc. Nat. Sci.] Misc. Publ. No. 7: 18 pp., ill.

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COLEOPTERA.—Blackman, M. W.—The Black Hills beetle (Dendroctonus ponderosae). [Bull. N. Y. State Coll. For. Syracuse Univ.] 4: 97 pp., ill. ***Buchanan, L. L.**—A new barine curculionid injurious to sugar cane in Louisiana with synopses of Anacentrinus and Oligolochus. [7] 25: 328-336, ill. ***Chapin, E. A.**—Revision of the pleurostict Scarabaeidae of Cuba and Isle of Pines. [7] 25: 282-314, ill. **Csiki, E.**—Coleopterorum Catalogus. Pars 121. Carabidae: Harpalinae VI. 1023-1278. **von Dalla Torre, Schenkling & Marshall.**—Coleopterorum Catalogus. Pars 122 and 123. Curculionidae: subfam. Hylobiinae, Curculioninae. 112 pp., 46 pp. ***Fall, H. C.**—New North American Scarabaeidae, with remarks on known species. [6] 40: 183-204. ***Fall, H. C.**—Random notes and descriptions. [19] 27: 145-148. ***Fisher, W. S.**—New West Indian cerambycid beetles. [50] 80, Art. 22: 93 pp. **Heymons & von Lengerken.**—Studien über die lebenserscheinungen der Silphini. [46] 25: 534-548, ill. **Hinds & Osterberger.**—Sugarcane rootstock weevils. [7] 25: 337-343, ill. ***Liebke, M.**—Laufkäfer-Studien X. [26] 12: 159-162, ill., cont. (S). ***Pic, M.**—Mélanges Exotico-Entomologiques. Fasc. 57-59. (S). ***Schaeffer. C.**—Notes and descriptions of new Cerambycidae. [19] 27: 152-154.

HYMENOPTERA.—Bequaert, J.—An arboreal nest of Bombus fervidus. [19] 27: 151. **Cockerell, T. D. A.**—Discontinuous distribution in bees. [31] 130: 58-59. **Cole, A. C. Jr.**—The rebuilding of mounds of the ant, Pogonomyrmex occidentalis. Nests of the ant, Formica subpolita in the western United States. [43] 32: 245-246, 247-248. ***Muesebeck, C. F. W.**—Four new North American species of Bassus (Braconidae) with notes on the genotype. [91] 22: 329-333. **Myers, J. G.**—Biological observations on some

neo-tropical parasitic Hymenoptera. [36] 80: 121-136, ill. ***Pickles, A.**—Notes on the natural enemies of the sugar-cane froghopper (Tomaspis saccharina) in Trinidad, with descriptions of new species. [22] 23: 203-210, ill. **Richards, O. W.**—Leptofoenus, a synthetic hymenopteron. [Pro. Ent. Soc. London] 7: 5.

A TEXTBOOK OF AGRICULTURAL ENTOMOLOGY by KENNETH M. SMITH, D.Sc., Ph.D., Entomologist to the Potato Virus Research Station, School of Agriculture, University of Cambridge. Cambridge, University Press, 1931. Pp. xiii, 285, frontispiece and 79 figures.—This volume, dealing with the insect pests of farm crops in Great Britain, is professedly modeled on John Curtis's *Farm Insects* of 1860 which, though "long out of date, remains the standard textbook on agricultural entomology in the British Isles." The Phytopathological Service, which includes both entomology and mycology, has divided England and Wales into twelve provinces, each with a collegiate advisory centre and this organization is briefly described. Methods of insect control and their application in farming practice are outlined and there is an interesting chapter (5 pages) on the effect of weather conditions on insect outbreaks. Ten chapters (233 pages) are devoted to those insects which are of agricultural importance, but excluding the pests of fruit, arranged by taxonomic orders. Under the phytophagous species, care is taken to list both the cultivated and the wild host plants. Evidently the author (page 1) would have preferred to illustrate a larger number of the insects described in the text than has been done, and the result would seem to necessitate the user of the book making reference to other works for such figures. Chapter XIV is concerned with insects and virus diseases of crops, a subject to which the author has given special attention. In Great Britain the aphis *Myzus persicae* can transmit no less than five virus diseases of the potato. A common solanaceous weed, the black nightshade, *Solanum nigrum,* is an almost symptomless carrier of one or more potato viruses, analogous to human typhoid or diphtheria carriers. *Myzus persicae,* which has fed on this nightshade, can infect healthy potatoes with the virulent virus. Appendices list crops and weeds by families giving symptoms of insect attacks and attacking insects. Selected bibliographies, including references to American literature, follow each chapter. There are three indices to this volume which, though chiefly of interest to residents of Britain, includes a number of species found also in North America.—P. P. CALVERT.

CLASSIFICATION OF INSECTS. A Key to the Known Families of Insects and Other Terrestrial Arthropods. By CHARLES T. BRUES, Associate Professor of Entomology, Harvard University, and A. L. MELANDER, Professor of Biology, College of the City of New York. Bulletin of the Museum of Comparative Zoology at Harvard College, Vol. LXXIII, 672 pp., 1121 figs. In paper covers $5.50, in cloth $6.50.—The *Key to the Families of North American Insects* of 1915 by the present authors (see the NEWS for May, 1915, pp. 233-234) has served in a general way as a model for the present and much more ambitious volume. The latter, as contrasted with the former, is world-wide, includes the other terrestrial arthropods, gives selected lists of literature under each order, suborder, or superfamily, and adds keys to larval forms under the Insecta in general, Odonata, Plectoptera, Plecoptera, Megaloptera, Trichoptera, Lepidoptera, Diptera and Hymenoptera (*not* Coleoptera). It goes more deeply into the classification than one might infer from the subtitle, first by restriction of the extent of the families and the consequent increase in their number, thus the Scarabaeidae of, let us say Blatchley's *Coleoptera of Indiana,* appear as nineteen families; second by often giving keys to subfamilies; and third by citing one or more genera, with their general distribution, of each family or subfamily. "The keys aim to reproduce as accurately as possible the most generally accepted system of classification of each group. They are necessarily to some extent heterogeneous as they represent the accumulated opinions and revisions of hundreds of workers during the course of many decades." The arrangement of the Hymenoptera, Diptera and to some extent of the Coleoptera represents, however, mainly the present authors' viewpoints. The authors "have attempted to correct all such errors of orthography" where "a few incorrectly formed family names have been used . . . sometimes over long periods." The glossary of special terms and the alphabetical index to genera and higher groups, features of the *Key* of 1915, have been retained, the latter of course enormously extended, occupying 53½ pages of three columns each. There is also a 3-page index of common names. It is questionable whether the figures, especially of the venation, are in all cases sufficiently labeled to enable the user to correctly interpret the keys without reference to more fully lettered illustrations elsewhere. Allusion is rightly made in the preface to "the tedious process of preparation," but the authors have produced a very useful handbook.—P. P. CALVERT.

FUNDAMENTALS OF INSECT LIFE. By C. L. METCALF, M.A., D.Sc., Professor of Entomology in the University of Illinois, and W. P. FLINT, Chief Entomologist, Illinois State Natural History Survey. McGraw-Hill Book Co., Inc., New York and London, 1932. Pp. xi, 581. 315 figs. $4.00.—The first ten chapters of this book bear the same titles as do the first ten chapters of an excellent work by the same authors, *Destructive and Useful Insects* (1928), reviewed in the NEWS for January, 1929 (pages 29-31). They have been revised and a number of additional illustrations accompany them; the greatest change is in Chapter VIII, The Important Orders and Families of Insects, which is expanded from 59 to 182 pages. It is regrettable that in their treatment of the Diptera, the authors should have adhered to Osten Sacken's term *tegula* for what is almost universally known as the *squama,* especially since they use *tegula,* in connection with the Hymenoptera, in its common application, for an organ which is not homologous with the squama. The first ten chapters occupy 438 pages as against 297 in the earlier book. As in their earlier work, the authors consider the embryology of insects "too technical to attempt to cover here." Considering the scope and detail of the book in other respects, it is regrettable that at least an outline of embryonic development is not included. Knowledge thereof adds so much to understanding the structure of insects, as in every other group of animals. Of the remaining three chapters two deal with the biology and ecology of insects, the living and the physico-chemical environments respectively. The last (thirteenth) chapter is on insect behavior. While frequent references to literature are given in footnotes throughout the volume, there is a classified bibliography of five pages near the end; it is composed chiefly of textbooks, manuals and compilations and includes very few original memoirs. The index is of slightly more than 54 pages of small type. It is the last three chapters which positively differentiate this volume from its predecessor. Of them the authors say in their preface: "Neither of the authors makes any claim to special knowledge of the field of animal ecology. In compiling the latter chapters of the book they have therefore become greatly indebted to many works on general and special phases of ecology, from which they have drawn extensively." A perusal of these chapters will, we believe, suffice to prove that the authors have produced a very clear and readable account of the phenomena thus far known.—P. P. CALVERT.

GENERAL CATALOGUE OF THE HEMIPTERA. G. Horvath, General Editor. H. M. Parshley, Managing Editor. Fascicle IV FULGOROIDEA Part I TETTIGOMETRIDAE by Z. P. METCALF, D. Sc., North Carolina State College. Published by Smith College, Northampton, Mass., U. S. A. 1932. 69 pp. $1.00.—"The plan is to issue the catalogue of each family of the Fulgoroidea, as recently defined by Muir, as a separate part of the general fascicle of the Fulgoroidea and then to issue a special part containing the bibliography and the index for the whole." As eighteen families are recognized, fascicle IV will be extensive. Seventy species and twelve genera are attributed to the Tettigometridae, of which only one (monotypic) genus and species, *Nototettigometra breddini* Muir, occurs in the New World (Peru); the others are Palaearctic, Ethiopian and Oriental. Some new names for Old World varieties are proposed.—P. P. CALVERT.

DICTIONARY OF AMERICAN BIOGRAPHY published under the auspices of American Council of Learned Societies by Charles Scribner's Sons, New York. Volume IX, June 20, 1932, contains, among others, a notice of George Henry Horn, the distinguished coleopterist, by L. O. H[oward], occupying a little more than one-half page.

Dr. Howard has also contributed a very interesting memoir of Stephen Alfred Forbes (1844-1930) to the BIOGRAPHICAL MEMOIRS OF THE U. S. NATIONAL ACADEMY OF SCIENCES, Vol. XV, Washington, 1932.

JOBS FOR THE COLLEGE GRADUATE IN SCIENCE. By EDWARD J. v. K. MENGE, Ph.D., Sc.D., Director of the Dept. of Zoology, Marquette University. The Bruce Publishing Co., New York, Milwaukee, Chicago. 1932. Pp. viii, 175. $2.00.—This little book aims to provide information which will assist the present generation of high school and college boys and girls and their parents in learning what possibilities are offered by the sciences and their applications when choosing a life-work. In the introduction emphasis is laid on the importance of acquiring a knowledge of fundamental laws and principles and the prospective student is warned against selecting the technical and applied sides of any subject to the exclusion of these. Entomology is considered (pages 122, 147, 155-157) as to the points of view from which it may be studied, the number of entomologists in the United States, their income, qualifications and training, available government positions, possibilities as consultants. The paragraph near the top of page 122 would seem to forget the good advice of the introduction in not holding out prospects of higher grades of work in this field.—P. P. CALVERT.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and only when necessary those at the top (being longest in) are discontinued.

Wanted for Cash—Eggs or living cocoons of Saturnia io form lilithe, Samia gloveri, and Callosamia angulifera.—Harriet A. Wickwire, 55 Tompkins Street, Cortland, New York.

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Wanted for Cash or Exchange—Entomological News, Vol. XXXIII, Nos. 9 and 10; Vol. XXXIV complete; Vol. XXXV, Nos. 1, 2, 3, 4, 5, 6, 7, 9. Have for exchange Canadian Entomologist, Vols. 56, 57 and 58. Robt. W. Glenn, 509 Orchard Avenue, Avalon, Pittsburgh, Pa.

Wanted—The first thirteen volumes of Entomological News, 1890 to 1902 inclusive. Preferably in original monthly parts, unbound. Write John M. Geddes, 331 High St., Williamsport, Pa.

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Wanted—October, 1919, and December, 1919, copies of Bulletin of the Brooklyn Entomological Society. Cash. Harriet A. Wickwire, 55 Tompkins St., Cortland, N. Y.

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